

U.S.S.N. 10,761,659

Remarks

Thorough examination by the Examiner is noted and appreciated.

The claims have not been amended.

Claim Rejections under 35 USC 102

1. Claims 1-2 and 10-11 stand rejected under 35 USC Section 102(b) as being anticipated by Fishkin et al. (US 5,697,750).

Fishkin et al. disclose a system for loading wafers into a vacuum environment (lowering a wafer cassette into a transfer chamber) where the wafer carrier cassette (42; Figure 1) is supported on an elevatable stage (26), **vertically moveable on elevator axis (28)** by a column member (24) that **threadably engaging a screw drive (32) outside the transfer chamber** and where a lower portion of the vertically elevatable stage (34; Figure 1) seals an upper portion of a transfer chamber (14) prior to vertically lowering the stage and cassette into the transfer chamber (14) for transfer into an adjacent processing chamber

U.S.S.N. 10,761,659

(82) (see Abstract; (col 4, line 52 - col 5, line 7; col 5, lines 8-18; col 7, lines 33-50). **Flexible bellows enclose that portion of the column member extending within the transfer chamber** (col 5, lines 12-14) **and excludes the screw drive mechanism** (32) and lower end of the column that threadably engages the screw drive mechanism. In operation, a sealing space (interface chamber) (68) between the lower portion of the elevatable stage (34) and the bottom of the cassette (carrier) (cover member) (46) and the transfer chamber (buffer) chamber (42) are evacuated to a pressure about equal to the pressure within the cassette (carrier), **prior to lowering the cassette into the transfer chamber** (col 6, lines 1-11; col 6, lines 45 - 61).

Thus, Fishkin et al. does not disclose several aspects of Applicants disclosed and claimed invention including those elements in **bold type**:

"a chamber wall defining a chamber interior;

a bellows housing defined by said chamber wall;

a shaft opening provided in said bellows housing;

U.S.S.N. 10,761,659

a flexible bellows provided in said bellows housing and sealing said shaft opening from said chamber interior;

a lift shaft having a cassette stage extending through said shaft opening and said bellows into said chamber interior, said lift shaft for positioning said cassette stage within said chamber interior at a wafer transfer position level; and,

a shaft rotation device **sealably isolated from said chamber interior by said bellows** and operably engaging said lift shaft for **rotating without raising** said lift shaft and said cassette stage in said chamber interior to said wafer transfer position."

Thus, Fishkin et al. is insufficient to anticipate Applicants independent and dependent claims.

Examiner erroneously asserts that Fishkin et al. disclose "a shaft rotation device **sealably isolated from said chamber interior by said bellows** and operably engaging said lift shaft for **rotating without raising** said lift shaft and said cassette

U.S.S.N. 10,761,659

stage in said chamber interior to said wafer transfer position.", but does not point to any teaching in Fishkin et al.

Thus, a wafer carrier (46) with a wafer cassette (48) enclosed may be vertically lowered (with rotation) in a stepwise manner (using a stepper motor in combination with a screw drive) i.e., by indexing to provided access to one semiconductor at a timed (col 8, lines 8-27). Thus, the wafer carrier is lowered to a wafer transfer position by a stepper motor and a screw drive (32) (col 5, lines 1-8), the stage member (26) is **fixedly connected** to the column member (24) and **is vertically moveable on elevator axis (28)** (col 4, lines 60-67). **Thus, if the stage member rotates by threadably engaging the column member, it both rotates and vertically moves the carrier stage and the wafers in the wafer cassette.** Nowhere does Fishkin et al. disclose that column member or the stage member (or wafer cassette) is rotatable or may be rotated to a wafer transfer position with **also raising (vertically moving) the column member.**

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v.*

U.S.S.N. 10,761,659

*Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

"The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

**Claim Rejections under 35 USC 103**

2. Claims 3-4, 7-8, and 12-13 stand rejected under 35 USC Section 103(a) as being unpatentable over Fishkin et al., above, in view of Kagatsume et al. (US 4,908,095).

Applicants reiterate the comments made above with respect to Fishkin et al.

On the other hand, Kagatsume discloses a **moveable electrode in an etching chamber** for carrying out an etching process where a lower electrode is connected to a lifter which **moves the electrode up and down by means of three ball screws** and nuts screwed onto the ball screws and fixed to a support plate for locally adjusting the levelness of the electrode. **A stainless steel bellows** connected to the bottom of the electrode and the

U.S.S.N. 10,761,659

bottom of the chamber seals the lifter mechanism from the chamber interior (see Figure 5, col 5).

Even assuming *arguendo*, a proper motivation for combining the disparate structures of the electrode lifter of Kagatsume and the wafer carrier lifter of Fishkin et al., such combination does not further help Examiner in producing Applicants disclosed and claimed invention or establishing a *prima facie* case of obviousness.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

3. Claims 5, 14, 17, 20, and 22 stand rejected under 35 USC Section 103(a) as being unpatentable over Fishkin et al., above, in view of Terada (US 5,324,540).

Applicants reiterate the comments made above with respect to Fishkin et al.

U.S.S.N. 10,761,659

On the other hand, Terada discloses a system for **supporting and rotating a wafer boat** (item 14, Figure 1) within a process chamber (tube furnace) where rotation is accomplished by a double magnet structure (20, Figure 1; Figure 2; 26 and 42) including a rotatable shaft (31) which passes through a bearing casing (46) where the bearing casing communicates with the process chamber (e.g., space 83; Figure 2) (see Abstract; col 1, line 64 - col 2, line 9); **The bearing casing (46; Figure 2) which includes ceramic bearings is in fluid (gaseous) communication with the process chamber** (col 2, lines 1-9; col 5, lines 25-30) and is exhausted by a series of exhausting steps (see Figure 3) with respect to exhausting the process chamber (col 5, line 60 - col 6 line 26) to prevent particles from the bearing casing from entering the process chamber.

There is no apparent motivation to combine the teachings of the disparate load-lock chamber screw drive lift mechanism of Fishkin et al. with the rotatable wafer boat processing system of Terada, other than Applicants disclosure. Fishkin et al. does not disclose or suggest that rotation of a wafer carrier (supported on a stage) without accompanying vertical movement of a lift shaft (column member) would be desirable and is

U.S.S.N. 10,761,659

specifically disclosed **to be only vertical moveable by a screw drive mechanism** to **vertically** position wafer at a wafer transfer position level. On the other hand, Terada does not disclose or suggest an elevator mechanism or disclose or suggest that the rotation mechanism of Terada would be desirable or workable together with a screw drive elevator mechanism such as the screw drive elevator mechanism taught by Fishkin et al.

Moreover, any attempt to modify Fishkin et al. with the rotation mechanism of Terada would be superfluous and serve no purpose and further, would make the screw drive elevator mechanism of Fishkin et al. **unsuitable for its intended purpose** including **vertically moving the elevator mechanism** in a stepwise manner to **vertically position** a wafer at a wafer transfer position level.

Nevertheless, even assuming *arguendo*, a proper motivation for combination, such combination does not produce Applicants disclosed and claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The



U.S.S.N. 10,761,659

teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

"If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

4. Claims 6, 15-16, and 18-19 stand rejected under 35 USC Section 103(a) as being unpatentable over Fishkin et al., above, in view of Terada, above, and further in view of Kagastsume et al., above.

Applicants reiterate the comments made above with respect to Fishkin et al., Terada, and Kagastsume et al.

Even assuming *arguendo*, a proper motivation for combination such combination, the fact that Kagatsume et al. teach a stainless steel bellows in a completely different apparatus, does not further help Examiner in producing Applicants disclosed and

U.S.S.N. 10,761,659

claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

5. Claim 9 stands rejected under 35 USC Section 103(a) as being unpatentable over Fishkin et al., above, in view of Kagastsume et al., above, and further in view of Terada, above.

Applicants reiterate the comments made above with respect to Fishkin et al., Terada, and Kagastsume et al.

Even assuming *arguendo*, a proper motivation for combination such combination does not produce Applicants disclosed and claimed invention.

"Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the

U.S.S.N. 10,761,659

reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

6. Claim 21 stands rejected under 35 USC Section 103(a) as being unpatentable over Fishkin et al., above.

As noted above, Fishkin et al. nowhere disclose or suggest "a shaft rotation device sealably isolated from said chamber interior by said bellows and operably engaging said lift shaft **for rotating without raising said lift shaft** and said cassette stage in said chamber interior to said wafer transfer position."

Fishkin et al. further fail to disclose or suggest "wherein the shaft rotation device is disposed within said bellows". Fishkin et al., rather specifically show a bearing assembly (30) mounted below the base (12) **(below the flexible bellows (38))** where the lower end of the column member (24) threadably engages a screw drive (32). Moreover, extending the bellows to enclose the screw drive member, as suggested by Examiner, is nowhere suggested by Fishkin et al. and would serve no useful purpose since it is outside the chamber (14).

U.S.S.N. 10,761,659

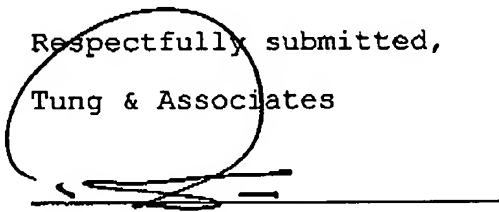
Conclusion

The cited references, either alone or in combination, fail to produce Applicants disclosed and claimed invention and therefore fail to make out a *prima facie* case of obviousness with respect to Applicants independent and dependent claims.

Based on the foregoing, Applicants respectfully request reconsideration of their claims and submit that Applicants Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention as claimed is not in a condition for allowance for any other reasons, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,  
Tung & Associates



U.S.S.N. 10,761,659

Randy W. Tung  
Reg. No. 31,311  
Telephone: (248) 540-4040